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Bei den ersteren wächst die Schnecke immer weiter canal-artig aus (Ductus cochlearis) und erfährt schliesslich bei Crocodiliern und Vögeln eine Krümmung sowie eine schwache Spiraldrehung. Hand in Hand damit geht eine immer schärfere Differenzierung der Lamina (Membrana) basilaris und der Papilla acustica basilaris. Beide strecken sich mehr und mehr in die Länge, und zugleich ist eine Scala tympani und vestibuli schon deutlich angelegt.<sup>2</sup>

It is barely possible that the author had in mind the lack of the arches of Corti in the auditory apparatus of birds. This is admitted by comparative neurologists;<sup>3</sup> but a well-marked basilar membrane is at hand. It will be remembered that one consideration which led Helmholtz to abandon the notion that the arches of Corti alone are responsible for the sensing of the differences in pitch and to assign that function to the fibers of the basilar membrane was due to the fact that birds possess the latter structure but not the former.

The author treats of Spatially determined Reactions and Space Perceptions, in two chapters. She discusses here: reaction to a single localized stimulus; orienting reactions; reaction to a moving stimulus; reaction to a retinal image; reactions adapted to the distance of objects. The various reactions considered in this part of the book should in all probability be treated together, but it is somewhat a stretch of the imagination to deal with them under a title so suggestive of organized mental life. Aside from this point we must comment upon the value of the organization of this complex material. Those of us who have followed in some measure the advances made in the study of the lower organisms know what a tremendous task it must have been to go through this field and to gather up the important facts and then systematically to organize them into a readable whole.

The latter part of the book deals with the modification of conscious processes by indi-

<sup>2</sup> "Vergleichende Anatomie der Wirbelthiere," fünfte Auflage, p. 324. Cf. also the monumental work of Retzius on the auditory organs of vertebrates.

<sup>3</sup> C. Hasse. See Helmholtz's "Sensations of Tone," p. 146.

vidual experience; the memory idea; and some aspects of attention.

The book as a whole is so well done that we venture the opinion that its usefulness will continue for several years to come. Its arrangement is such that the results of later researches as they appear from time to time may be easily incorporated into successive editions.

JOHN B. WATSON

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*A Pocket Handbook of Minerals*, designed for use in the field or class-room with little reference to chemical tests. By G. MONTAGUE BUTLER, E.M., Assistant Professor of Geology and Mineralogy, Colorado School of Mines, Golden, Colorado, United States Deputy Mineral Surveyor. 16mo, pp. ix + 298. 89 figures. Morocco, \$3 (12/6 net). New York, John Wiley & Sons; London, Chapman & Hall, Limited. 1908.

This book is designed for both field and class work and to fill a space between works "too cumbersome" for the field and works "so condensed as to confuse rather than aid."

Two hundred species are described in terms of those characters which the author considers best help in their determination, and preference is given to the so-called "physical features." Each species is described in the same fixed order and certain chosen characters are brought into especial prominence by the use of heavy-face type so that "a mere glance at a page will often suffice to recall the appearance of a mineral."

In the selection of important characters as indicated by heavy-face type, very great prominence is given to cleavage and very little to blowpipe or acid tests. It is certainly to be questioned whether in the field with average specimens, not usually crystals, even the trained mineralogist can determine more than the existence or non-existence of marked cleavage and in certain instances the approximate cleavage angles. The blowpipe is usually as available as the goniometer or microscope.

Following the descriptions of species, which occupy 270 pages, are some ten pages of miscellaneous tables including lists of commercially

important ores, retail prices of cut gems, values of metals and minerals; then follows an admirable glossary in which, however, some of the fundamental terms, such as crystal, mineral and polarize, are not defined with scientific accuracy.

The tables which follow the index are summaries of the descriptions, characters in parallel columns and minerals in order of description.

The book is of convenient size for the pocket and embodies much easily accessible and useful information. In spite, however, of the fact that it is, as explicitly stated, designed for the determination of minerals, its value in the absence of all systematic schemes would seem to be rather to refresh the user's memory as to the characters of known or suspected minerals, than as a guide to the determination of unrecognized material.

A. J. MOSES

*Analysis of Mixed Paints, Color Pigments and Varnishes.* By C. D. HOLLEY, Ph.D., and E. F. LADD, B.S., Professors of Chemistry, North Dakota Agricultural College. New York, John Wiley & Sons. Pp. 235.

This book presents in a more accessible and considerably enlarged form the results of the work done in connection with the enforcement of the North Dakota paint law. It gives the latest and best methods for the analysis of the substances mentioned in its title, and, what is still more valuable, the composition of these articles as found on the American market.

The method for the analysis of linseed oil, however, is incomplete, no mention being made of the process for detecting fish oil in it with certainty.

Incidentally it furnishes a striking commentary on the honesty and integrity of the American paint and oil trade. The authors' investigations showed "white leads" which contained no lead carbonate and but five per cent. of lead sulphate; other pigments were found which were branded in a manner calculated to mislead. Not content with this sort of fraud, water, in some cases to the extent of twenty-five per cent., was mixed with the paints and these put up in packages

which were 10 to 13 per cent. short in weight or measure! The authors have done a real service in showing up such conditions.

The work is one of the best contributions to the literature of these subjects that have appeared, dealing not only with analyses, but also with specifications, and the application and testing of paints on a large scale, and should be in the library of every one having to do with the subjects treated.

A. H. GILL

#### SPECIAL ARTICLES

##### SOME CONDITIONS AFFECTING VOLCANIC ERUPTIONS

IN the study of such natural phenomena as are difficult to investigate by reason of inaccessibility, or of danger to the observer, it is natural and often advantageous to consider some analogous, but less obscure phenomenon and, from a careful study of this, to deduce the laws which govern the former. A case in point is that of a volcano in eruption which, by its very nature, prohibits close inspection, but with which a certain degree of parallelism is found in the action of geysers. More than thirty years ago Fuchs called attention to the similarity existing between the two, comparing the column of water in the geyser tube to the lava in the interior of a volcano and stating that geysers "ont encore une grande importance en ce sens qu'ils nous permettent de nous faire une idée claire des phénomènes qui produisent les éruptions volcaniques." (K. Fuchs, "Les volcans et les tremblements de terre.") In the light of modern volcanological science, however, this generalization of the term "éruptions volcaniques" will be found too sweeping, for it is clear that the action of a trachytic volcano, whose highly silicious magma is at best in a viscous state, can with difficulty be considered as analogous to that of a geyser where fluidity is the most evident characteristic. A comparative study of the two phenomena should, therefore, be prefaced by the explicit statement that the volcano in consideration is of the basaltic type, with lava which is liquid at the temperature of action, and con-